CLAIMS

What is claimed is:

1. In a railroad car truck assembly having longitudinally spaced apart wheel sets, transversely extending axles, and wheels mounted to the axles, transversely spaced apart longitudinally extending side frames mounted to the axles, and a transversely extending bolster mounted to the side frames, the improvement comprising,

a yaw stabilizing means mounted on a side frame, and distally disposed relative to the lateral centerline of the truck, the yaw stabilizing means comprising,

a first pivot means mounted on the side frame at a location distally disposed relative to the lateral centerline of the truck;

a pivot bar pivotably disposed on the pivot means, the pivot bar having a pair of first and second spring arms, the first spring arm being located inside the longitudinal axis of the side frame and the second spring arm located outside, each spring arm diverging substantially equiangularly from a central vertical plane through the pivot means and along the longitudinal axis therethrough, each end of each spring arm extending toward the lateral center line of the bolster, the first spring arm adapted for engagement with a first linking inside the longitudinal axis of the side frame, and the second spring arm having a second linking means outside the longitudinal axis of the side frame;

inside and outside anchoring means in laterally spaced-apart relationship on a side of the bolster, near an end thereof, and on opposite sides of the longitudinal axis of the side frame, the inside anchoring means being adapted to engage the first linking means at a predetermined location laterally spaced apart from the longitudinal centerline of the side frame, and the outside anchoring means being adapted to engage the second linking means at a predetermined location laterally spaced apart from the longitudinal centerline of the side frame;

whereby the spring arms connected to the bolster through the linking means actively controls relative rotational movement of the side frame relative to the bolster.

2. The assembly of claim 1 wherein the first pivot means is mounted in a side frame opening defined by elongated substantially longitudinal, vertical and angulated members of the side frame.

3. The assembly of claim 1 wherein each spring arm, near each end, is provided with a hook, and each anchoring means is provided with a hook, each hook of a spring arm being adapted to be coupled to an adjacent hook of an anchoring means; and, the linking means is a continuous link.

4. The assembly of claim 1 wherein each spring arm, near each end, is provided with a ring, and each anchoring means is provided with a ring, each ring of a spring arm being adapted to be coupled to an adjacent ring of an anchoring means; and the linking means is an assembly of split links.

5. The assembly of claim 1 wherein the outside anchoring means includes a second pivot means mounted near one end of the bolster, the second pivot means adapted to provide a rocker arm with a rocking motion through a predetermined arc in the lateral plane, one end of the rocker arm being adapted to engage the second linking means, and the other end being adapted to be biased away from the bolster's surface to preload the stabilizing means.

6. The assembly of claim 5 wherein the second pivot means is a vertically disposed pivot pin in a clevis block fixed to the bolster.

7. The assembly of claim 1 wherein the spring arms are preloaded, and, the vertical plane through each linking means and a vertical plane through the first pivot means and an end of the linking means held in the end of the first spring arm of the pivot bar, forms an acute angle.

8. The assembly of claim 1 wherein each side frame of the truck has a yaw stabilizing means disposed thereon.

9. The assembly of claim 1 wherein each side frame of the truck has a pair of yaw stabilizing means disposed thereon, one oppositely mounted in substantially mirror-image relationship with the other.

10. The assembly of claim 1 wherein each linking means has a minimum length ineffective to substantially bend a spring arm for a predetermined suspension spring deflection.

11. The assembly of claim 5 wherein the rocker arm includes locking means to lock one end of the arm when biased against the bolster to pre-load both spring arms in opposed bending to each other.

12. The assembly of claim 5 wherein each spring arm, near each end, is provided with a hook, each rocker arm near its one end is provided with a hook, and each anchoring means is provided with a hook, each hook of a spring arm being adapted to be coupled to a hook selected from an adjacent hook of an anchor block and an adjacent hook on a rocker arm, and the linking means is a continuous link.

13. The assembly of claim 5 wherein each spring arm, near each end, is provided with a ring, and each rocker arm near its one end is provided with a ring, and each anchoring means is provided with a ring, each ring of a spring arm being adapted to be coupled to a ring selected from an adjacent ring of an anchor block and an adjacent ring on a rocker arm; and the linking means is an assembly of split links.

14. The assembly of claim 1 wherein each spring arm has a stiffness greater than one thousand pounds force per inch (1000 lbf/in) of deflection.

15. The assembly of claim 1 wherein the numerical value of the stiffness of each spring arm is greater than one hundred (100) times the numerical value of the combined mass of the pivot bar and its spring arms, using compatible units of measure.

16. In a railroad car truck assembly having longitudinally spaced apart wheel sets, transversely extending axles, and wheels mounted to the axles, transversely spaced apart longitudinally extending side frames mounted to the axles, and a transversely extending bolster mounted to the side frames, the improvement comprising,

a pair of first and second yaw stabilizing means oppositely mounted in

substantially mirror-image relationship with each other, on each side frame;

the first yaw stabilizing means comprising a first pivot means mounted on a side frame at a location distally disposed relative to the lateral centerline of the truck; and,

the second yaw stabilizing means comprising a second pivot means mounted on the same side frame at a location equidistant from the first pivot means and on the same longitudinal line through the first pivot means;

each first and second pivot means having a pivot bar pivotably mounted thereon, the pivot bar having a pair of first and second spring arms, each spring arm diverging substantially equiangularly from a central vertical plane through the pivot means along the longitudinal axis therethrough, an end of each arm extending toward the lateral center line of the bolster, the spring arms being preloaded to a predetermined extent;

a pair of first and second anchoring means oppositely disposed and fixed to the bolster on either side of the longitudinal axis of each side frame, the anchoring means being adapted for engagement with first and second linking means, respectively, on opposite sides of the longitudinal axis of the side frame;

the first linking means adapted to engage one end of a first anchoring means to one end of a first spring arm;

the second linking means adapted to engage one end of a second anchoring means to one end of the second spring arm;

each linking means adapted to provide limited movement of each spring arm in a lateral plane, each linking means having a minimum length ineffective to substantially bend a spring arm for a predetermined suspension spring deflection;

whereby both, limited lateral movement of the bolster and such vertical movement as is provided by suspension springs in the side frames, is provided for; and each yaw stabilizing means provides a linear restoring moment between the side frame and the bolster when the side frame is rotated about the end of the bolster.

17. The assembly of claim 16 wherein each pair of anchoring means includes an outside stub anchor having one end adapted to engage a link, the outside stub anchor being fixedly disposed to the bolster on one side of the longitudinal axis of each side frame, and an inside stub anchor having one end adapted to engage a link, the inside

stub anchor being fixedly disposed to the bolster on the other side of the longitudinal axis of each side frame.

18. The assembly of claim 16 wherein each pair of anchoring means includes a rocker arm pivotably mounted in a pivot block on one end of the bolster, the rocker arm having one end adapted to engage a link, and an inside stub anchor having one end adapted to engage a link, the inside stub anchor being fixedly disposed to the bolster inside the longitudinal axis of each side frame.

19. The assembly of claim 16 wherein the first pivot means is a spherical ball-pivot and is mounted in a side frame opening defined by elongated substantially longitudinal, vertical and angulated members of the side frame.

20. The assembly of claim 16 wherein each spring arm, near each end, is provided with a hook, and each anchoring means is provided with a hook, each hook of a spring arm being adapted to be coupled to an adjacent hook of an anchoring means; and, the linking means is a continuous link.

21. The assembly of claim 16 wherein each spring arm, near each end, is provided with a ring, and each anchoring means is provided with a ring, each ring of a spring arm being adapted to be coupled to an adjacent ring of an anchoring means; and the linking means is an assembly of split links.

22. In a railroad car truck assembly having longitudinally spaced apart wheel sets, transversely extending axles, and wheels mounted to the axles, transversely spaced apart longitudinally extending side frames mounted to the axles, and a transversely extending bolster mounted to the side frames, the improvement comprising,

a pair of first and second yaw stabilizing means oppositely mounted in substantially mirror-image relationship with each other, on each side frame, each yaw stabilizing means comprising,

a side frame pivot means mounted on each side frame at equidistant locations relative to the lateral centerline through the bolster, and a pivot bar having angularly

diverging spring arms pivotably disposed on the pivot means for reciprocal motion in a lateral plane, one spring arm being inside, relative to the longitudinal axis of the side frame, and the other being outside;

oppositely disposed bolster pivot means mounted on each side of the lateral axis of each bolster and near the end of the bolster, at equidistant locations relative to the longitudinal axis of the side frame;

a rocker arm pivotably disposed on each bolster pivot means, to allow a rocking motion of the rocker arm in a lateral plane;

an inside anchoring means oppositely mounted from each bolster pivot means and within substantially the same lateral plane, the inside anchoring means being adapted to engage the second linking means at a predetermined location laterally spaced apart from the longitudinal centerline of the side frame;

oppositely disposed linking means, one adapted to engage one end of each rocker arm and one end of each outside spring arm, the other linking means being adapted to engage the anchoring means and each inside spring arm, each linking means adapted to provide limited movement of each spring arm in a lateral direction, each linking means having a minimum length ineffective to substantially bend a spring arm for a predetermined suspension spring deflection; and,

locking means to lock one end of each rocker arm in a position away from the bolster's surface to pre-load each spring arm in opposed bending to each other;

whereby both, limited lateral movement of the bolster and such vertical movement as is provided by suspension springs in the side frames, is provided for; and each yaw stabilizing means provides a linear restoring moment between the side frame and the bolster when the side frame is rotated about the end of the bolster.

23. The assembly of claim 22 wherein the yaw stabilizing means fails to noticeably increase the unsprung weight of the railroad car.

24. The assembly of claim 23 wherein each spring arm, near each end, is provided with a hook, each rocker arm near its one end is provided with a hook, and each anchoring means is provided with a hook, each hook of a spring arm being adapted to be coupled to a hook selected from an adjacent hook of an anchor block spring arm and an adjacent hook on a rocker arm, and the linking means is a continuous link.

25. The assembly of claim 23 wherein each spring arm, near each end, is provided with a ring, and each rocker arm near its one end is provided with a ring, and each anchoring means is provided with a ring, each ring of a spring arm being adapted to be coupled to a ring selected from an adjacent ring of an anchor block and an adjacent ring on a rocker arm; and the linking means is an assembly of split links.

26. A method of stabilizing a railroad car truck assembly against deleterious yawing at any speed up to 240 km/hr (150 mph) without adding stiffness to the truck except for stabilization forces when the truck's components are warped, and without locking the bolster in position relative to the side frames so as to allow lateral and vertical movement of the bolster, the method comprising,

mounting a pair of first and second yaw stabilizing means in substantially mirror-image relationship with each other relative to the lateral centerline of the bolster, on each side frame, each yaw stabilizing means comprising a side frame pivot means mounted on each side frame at equidistant locations relative to the lateral centerline through the bolster, and a pivot bar having angularly diverging spring arms pivotably disposed on the pivot means for reciprocal motion in a lateral plane;

preloading the spring arms to a predetermined extent by drawing them towards each other;

fixing a pair of first and second anchoring means oppositely disposed relative to each other and fixed to the bolster on either side of the longitudinal axis of each side frame, the anchoring means being adapted for engagement with first and second linking means, respectively, on opposite sides of the longitudinal axis of the side frame, the first linking means adapted to engage one end of a first anchoring means to one end of a first spring arm; the second linking means adapted to engage one end of a second anchoring means to one end of the second spring arm; each linking means adapted to provide limited movement of each spring arm in a lateral plane, each linking means having a minimum length ineffective to substantially bend a spring arm for a predetermined suspension spring deflection;

whereby warping of the truck when negotiating a curve is minimized.

27. The method of claim 26, including,

mounting a pair of oppositely disposed bolster pivot means on each side of the lateral axis through the bolster and near the end thereof, at equidistant locations relative to the longitudinal centerline through the side frame;

pivotably disposing a rocker arm on each bolster pivot means, to allow a rocking motion of the rocker arm in a lateral plane;

connecting one end of each rocker arm and one end of each spring arm with a linking means adapted to provide limited movement of each spring arm in a lateral plane, each linking means having a minimum length ineffective to substantially bend a spring arm for a predetermined suspension spring deflection; and,

biasing the other end of each rocker arm away from the bolster's surface to pre-load each spring arm in opposed bending to each other and locking the end of each rocker arm in a predetermined position.